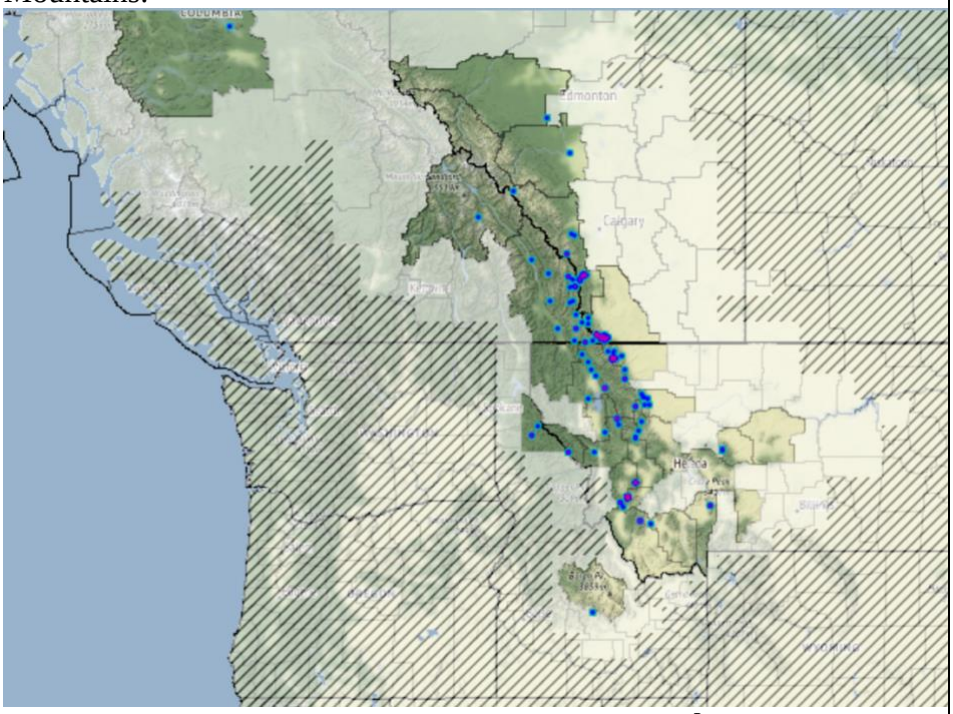
Plant Propagation Protocol for Astragalus bourgovii
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/2024/ASBO3

TAXONOMY	
Plant Family	
Scientific Name	Fabaceae
Common Name	Pea family
Species Scientific Name	
Scientific Name	*Astragalus bourgovii A.* Gray
Varieties	NA
Sub-species	NA
Cultivar	NA
Common Synonym(s)	NA
Common Name(s)	Bourgov's milkvetch
Species Code (as per USDA Plants database)	ASBO3
GENERAL INFORMATION	
Geographical range	Ranges throughout Southern B.C. and Alberta, CA, and down into Northern Idaho and Western Montana.[1] Endemic to the Rocky Mountains.[4]  .Image source: Lady Bird Johnson Wildflower Center[2]

Ecological distribution	Occurs in stony soils in opens forests, meadows, and grasslands in mountain regions.[3] Is considered rare in Idaho and have a limited distribution.[4]
Climate and elevation range	Found in the Subalpine and alpine above 1800m.[3,4] Moderate snowfall, annual lows of about -15 degrees Celsius. [6]
Local habitat and abundance	*Achillea lanulosa*[9] *Lupinus leucophyllus*[9] *Tsuga mertensiana*[4] *Abies bifolia*[4] *Pinus albicaulis*[4] *Astragalus alpinu*[4]
Plant strategy type / successional stage	An early successional species due to its relationship with rhizomes which allow it to colonize marginalized soils.[7]
Plant characteristics	A perennial herb that produces purple flowers. Leaves are pinnately compound with each leaflet being oblong with entire margins, and 2-3 cm long.[5] Lives longer than 4 years. Flowers are characteristic to those in the Fabaceae family.[3]
PROPAGATION DETAILS	
All information in this section is from Luna T., Evans J, Wick D. *Astragalus bourgovii* propagation protocol[8]	
Ecotype	Limestone talus, Siyeh Bend, Glacier National Park, 2032m elevation
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container(plug)
Stock Type	160 ml containers
Time to Grow	8 months
Target Specifications	3cm in height with a firm root system
Propagule Collection Instructions	Collect seeds when legumes are beginning to split. The seeds should be brown. Collect into paper bags and store in a dry, well-ventilated area.
Propagule Processing/Propagule Characteristics	Seed density is approximately 220,00/kg. Seeds live for at least 20 years. The seeds had 100% purity and a 12% germination rate.
Pre-Planting Propagule Treatments	Hand clean seeds and then scarify with sandpaper to break physical dormancy. Next, soak seeds in hot water for up to 20 seconds and immediately transfer to cold water to soak for 24 to 48 hours. Finally, sow seeds outdoors in cold/moist weather for 5 months to cold stratify seeds.
Growing Area Preparation / Annual Practices for Perennial Crops	Grow in outdoor nursery using a growing medium that is 6:1:1 milled spaghnum peat, perlite, and vermiculite. Can use Osmocote controlled released fertilizer combined with Micromax fertilizer at a rate of 1 gram of Osmocote per 0.2 gram of Micromax per 172 ml container.

	Fill containers and sow in late fall, making sure to water before cold stratification. Seeds will germinate the following spring and need to be grown under full sun exposure. Water seedlings each morning until containers are saturated
Establishment Phase Details	Keep medium moist during the germination period. During mid-May, true leaves will emerge. At this point inoculation with a suitable Rhizobium strain is possible and may increase growth.[7]
Length of Establishment Phase	4 weeks
Active Growth Phase	Roots will develop soon after germination. After 6 weeks 4-6 true leaves were noted. Fertilize plants with a 1:1:1 liquid NPK at 100 ppm.
Length of Active Growth Phase	12 weeks
Hardening Phase	Prior to outplanting, seedlings are hardened for two weeks.
Length of Hardening Phase	2 weeks
Harvesting, Storage and Shipping	After 8 months seedlings are ready to harvest in August
Length of Storage	5 months
Guidelines for Outplanting / Performance on Typical Sites	NA
Other Comments	May be beneficial to inoculate with rhizomes.
INFORMATION SOURCES	
References	1. USDA Plants Database. *Astragalus bourgovii A.* Gray. United States Department of Agriculture. 2. TWC Staff. *Astragalus bourgovii*. 2022. Lady Bird Johnson Wildflower Center. The University of Texas at Austin. https://wildflowersearch.org/tmap?25441 3. Bourgeau's Milkvetch — Astragalus bourgovii. Montana Field Guide. Montana Natural Heritage Program. https://fieldguide.mt.gov/speciesDetail.aspx?elcode=PDFAB0F1E0 4. Moseley RK. Vascular Flora of Subalpine Parks in the Coeur D-Alene River Drainage, Northern Idaho. 1996. Madroño 43(4):479-492. https://www.jstor.org/stable/41425165?casa_token=eWu6IJhKS3oAAAAA%3As-z6QnCpbuIF_194lLvlc5ogjItLnzhkcWPVduiUNvPJ8P0vvFaOHgEkZg04fGaZ65yKdYBdgVRx5OSvDSZRV-gBcwsuATUqgbCYJ4xCG375ft30sIdh8Q&seq=5 5. Bogler D. Comprehensive Description of Bourgov's Milkvetch. Encyclopedia of Life. https://eol.org/pages/416618

	6. Shaw RK. 1979. Flora of the Lee Creek Valley, Alberta. The Great Basin Naturalist 39(3): 277-283. https://www.jstor.org/stable/41711693?casa_token=3BYMLQ4uQiQAAAAA%3AGffzV93jwY6_HrEiADZLJ0DlT3Sxz06EkK1H_WojQTi_xLiafkYl45EAs2QIRU97sb6nsT-rvQmQfyvB_azE1VW8k_D1e47djXkI0IGBqbsCRMKc3FuTAg&seq=2 7. Smyth CR. Establishment and Growth of Mycorrhizal and Rhizobium Inoculated High-Evelvation Native Legumes on an unamended Coal Mine Spobl Dump in Southeastern British Columbia. 1997. The Technical and Research Committee on Reclamation. https://open.library.ubc.ca/media/stream/pdf/59367/1.0042318/3 8. Luna T, Evans J, Wick D.. 2008. Propagation protocol for production of Container (plug) *Astragalus bourgovii* Gray plants 160 ml conetainers; USDI NPS - Glacier National Park West Glacier, Montana. In: Native Plant Network. https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=fabaceae-astragalus-113 9. Mueggler WF, Bartos DL. Grindstone Flate and Big Flate Exclosures – A 41-Year Record of Changes in Clearcut Aspen Communities. 1997. USDA Forest Service Research Paper. https://www.fs.usda.gov/rm/pubs_int/int_rp195.pdf
Other Sources Consulted	Smyth CR. Early Succession Patterns with a Native Species Seed Mix on Amended and Unamended Coal Mine Spoil in the Rocky Mountains of Southeastern British Columbia, Canada. 1997. Artic and Alpine Research 29(2): 184-195.
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Date Protocol Created or Updated	05/17/2024